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ROCHESTER GAS AND ELECTRIC CORPORATION

GINNA STATION

CONTROLLED COPY NUMBER 23

TECHNICAL REVIEW

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Thomas A. Marlowe
PLANT SUPERINTENDENT

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EFFECTIVE DATE

CATEGORY 1.0

REVIEWED BY: _____

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A. PURPOSE - This procedure provides actions to cool down and depressurize the RCS to cold shutdown conditions while minimizing loss of RCS inventory and voiding in the RCS for an SGTR concurrent with a LOCA (i.e. Ruptured-Faulted S/G).

B. ENTRY CONDITIONS/SYMPTOMS

1. ENTRY CONDITIONS - This procedure is entered from:

- a. E-3, STEAM GENERATOR TUBE RUPTURE, if ruptured S/G can not be isolated from any intact S/G.
- b. E-3, STEAM GENERATOR TUBE RUPTURE, if PRZR PORV can not be isolated by closing its block valve.
- c. E-3, STEAM GENERATOR TUBE RUPTURE, if ruptured S/G is faulted.
- d. E-3, STEAM GENERATOR TUBE RUPTURE, if no intact S/G is available for RCS cooldown.
- e. E-3, STEAM GENERATOR TUBE RUPTURE, if minimum D/P between ruptured and intact S/G cannot be maintained.
- f. E-3, STEAM GENERATOR TUBE RUPTURE, if RCS subcooling is less than required.
- g. E-3, STEAM GENERATOR TUBE RUPTURE, if RCS pressure does not increase after closing PRZR PORV and block valve.
- h. E-3, STEAM GENERATOR TUBE RUPTURE, and ECA-3.3, SGTR WITHOUT PRESSURIZER PRESSURE CONTROL, if SI can not be terminated.
- i. E-3, STEAM GENERATOR TUBE RUPTURE, and ECA-3.3, SGTR WITHOUT PRESSURIZER PRESSURE CONTROL, if SI is reinitiated after termination.
- j. E-3, STEAM GENERATOR TUBE RUPTURE, ES-3.1, POST-SGTR COOLDOWN USING BACKFILL, ES-3.2, POST-SGTR COOLDOWN USING BLOWDOWN, and ES-3.3, POST-SGTR COOLDOWN USING STEAM DUMP, if SI accumulators should not be isolated.

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- k. ES-3.1, POST-SGTR COOLDOWN USING BACKFILL,
ES-3.2, POST-SGTR COOLDOWN USING BLOWDOWN, and
ES-3.3, POST-SGTR COOLDOWN USING STEAM DUMP, if
a non-ruptured S/G is not available for RCS cooldown.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

<u>CAUTION</u>		
<ul style="list-style-type: none">o IF RWST LEVEL DECREASES TO LESS THAN 28%, THEN THE SI SYSTEM SHOULD BE ALIGNED FOR COLD LEG RECIRCULATION USING ES-1.3, TRANSFER TO COLD LEG RECIRCULATION.o IF OFFSITE POWER IS LOST AFTER SI RESET, THEN SELECTED SW PUMPS AND ONE CCW PUMP WILL AUTO START ON EMERGENCY D/G. MANUAL ACTION WILL BE REQUIRED TO RESTART SAFEGUARDS EQUIPMENT.		

<u>NOTE:</u> <ul style="list-style-type: none">o Foldout page should be open AND monitored periodically.o Adverse CNMT values should be used whenever CNMT pressure is greater than 4 psig or CNMT radiation is greater than 10^{+05} R/hr.		
1	Reset SI	
2	Reset CI:	
	a. Depress CI reset pushbutton	
	b. Verify annunciator A-26, CNMT ISOLATION - EXTINGUISHED	b. Perform the following: <ul style="list-style-type: none">1) Reset SI.2) Depress CI reset pushbutton.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
3	Verify Adequate SW Flow:	
a.	Check at least two SW pumps - RUNNING	a. Manually start SW pumps as power supply permits (258 kw each).
		<u>IF</u> less than two SW pumps running, <u>THEN</u> perform the following:
		1) Ensure SW isolation.
		2) Dispatch AO to establish normal shutdown alignment (Refer to Attachment SD-1).
		3) Go to Step 5.
b.	Dispatch AO to establish normal shutdown alignment (Refer to Attachment SD-1)	

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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

4 Establish IA to CNMT:

a. Verify non-safeguards busses energized from offsite power

o Bus 13 normal feed - CLOSED

-OR-

o Bus 15 normal feed - CLOSED

b. Verify SW isolation valves to turbine building - OPEN

- MOV-4613 and MOV-4670
- MOV-4614 and MOV-4664

c. Verify at least two air compressors - RUNNING

d. Check IA supply:

- o Pressure - GREATER THAN 60 PSIG
- o Pressure - STABLE OR INCREASING

e. Reset both trains of XY relays for IA to CNMT AOV-5392

f. Verify IA to CNMT AOV-5392 - OPEN

a. Perform the following:

1) Close non-safeguards bus tie breakers:

- Bus 13 to Bus 14 tie
- Bus 15 to Bus 16 tie

2) Verify adequate emergency D/G capacity to run air compressors (75 kw each).

IF NOT, THEN evaluate if CNMT RECIRC fans should be stopped (Refer to Attachment CNMT RECIRC FANS).

b. Manually align valves.

c. Manually start air compressors as power supply permits (75 kw each). IF air compressors can NOT be started, THEN dispatch AO to locally reset compressors as necessary.

d. Perform the following:

- 1) Continue attempts to restore IA (Refer to AP-IA.1, LOSS OF INSTRUMENT AIR).
- 2) Continue with Step 5. WHEN IA restored, THEN do Steps 4e and f.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
5	<p>Verify All AC Busses - ENERGIZED BY OFFSITE POWER</p> <ul style="list-style-type: none"> o Normal feed breakers to all 480 volt busses - CLOSED o 480 bus voltage - GREATER THAN 420 VOLTS o Emergency D/G output breakers - OPEN 	<p>Perform the following:</p> <ul style="list-style-type: none"> a. <u>IF</u> any AC emergency bus normal feed breaker open, <u>THEN</u> ensure associated D/G breaker closed. b. Perform the following, as necessary: <ul style="list-style-type: none"> 1) Close non-safeguards bus tie breakers: <ul style="list-style-type: none"> • Bus 13 to Bus 14 tie • Bus 15 to Bus 16 tie 2) Place the following pumps in PULL STOP: <ul style="list-style-type: none"> • EH pumps • Turning gear oil pump • HP seal oil backup pump 3) Restore power to MCCs. <ul style="list-style-type: none"> • A from Bus 13 • B from Bus 15 • E from Bus 15 • F from Bus 15 4) <u>WHEN</u> bus 15 restored, <u>THEN</u> reset control room lighting. 5) Refer to Attachment SI/UV for other equipment lost with loss of offsite power. c. Try to restore offsite power to all AC busses (Refer to ER-ELEC.1, RESTORATION OF OFFSITE POWER).

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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

6 Check If CNMT Spray Should Be Stopped:

- | | |
|---|---|
| a. CNMT spray pumps - ANY RUNNING | a. Go to Step 7. |
| b. Verify CNMT pressure - LESS THAN 4 PSIG | b. Continue with Step 7. <u>WHEN</u> conditions satisfied, <u>THEN</u> do Steps 6c through f. |
| c. Reset CNMT spray | |
| d. Check NaOH tank outlet valves - CLOSED <ul style="list-style-type: none">• AOV-836A• AOV-836B | d. Place NaOH tank outlet valve controllers to MANUAL and close valves. |
| e. Stop CNMT spray pumps and place in AUTO | |
| f. Close CNMT spray pump discharge valves <ul style="list-style-type: none">• MOV-860A• MOV-860B• MOV-860C• MOV-860D | |



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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
***** <u>CAUTION</u> RCS PRESSURE SHOULD BE MONITORED. IF RCS PRESSURE DECREASES TO LESS THAN 250 PSIG [465 PSIG ADVERSE CNMT], THEN THE RHR PUMPS MUST BE MANUALLY RESTARTED TO SUPPLY WATER TO THE RCS. *****		
7	Check If RHR Pumps Should Be Stopped: a. Check RCS pressure: o Pressure - GREATER THAN 250 psig [465 psig adverse CNMT] o Pressure - STABLE OR INCREASING b. Stop RHR pumps and place in AUTO	a. Go to Step 8.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
8	Evaluate Plant Status:	
a.	Check auxiliary building radiation - NORMAL <ul style="list-style-type: none"> • Plant vent iodine (R-10B) • Plant vent particulate (R-13) • Plant vent gas (R-14) • CCW liquid monitor (R-17) • Letdown line monitor (R-9) • CHG pump room (R-4) 	a. Notify HP and refer to appropriate AR-RMS procedure.
b.	Direct HP to obtain following samples: <ul style="list-style-type: none"> • RCS boron • RCS activity • CNMT hydrogen • CNMT sump boron • BASTs boron 	
c.	Verify adequate Rx head cooling: <ol style="list-style-type: none"> 1) Check IA to CNMT - AVAILABLE 2) Verify at least one control rod shroud fan - RUNNING 3) Verify one Rx compartment cooling fan - RUNNING 	<ol style="list-style-type: none"> 1) Go to Step 9. 2) Manually start one fan as power supply permits (45 kw). 3) Perform the following: <ul style="list-style-type: none"> o Dispatch AO to reset UV relays at MCC C and MCC D. o Manually start one fan as power supply permits (23 kw).

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
9	Establish 75 GPM Charging Flow:	
	a. Charging pumps - ANY RUNNING	a. Perform the following:
		1) <u>IF</u> CCW flow is lost to any RCP thermal barrier <u>OR</u> any RCP #1 seal outlet temperature offscale high, <u>THEN</u> dispatch AO with RWST area key to locally isolate seal injection to affected RCP.
		• RCP A, V-300A • RCP B, V-300B
		2) Ensure HCV-142 open.
	b. Align charging pump suction to RWST:	b. <u>IF</u> LCV-112B can <u>NOT</u> be opened, <u>THEN</u> perform the following:
	o LCV-112B - OPEN	1) Verify charging pump A <u>NOT</u> running and place in PULL STOP.
	o LCV-112C - CLOSED	2) Dispatch AO to locally open manual charging pump suction from RWST (V-358 located in charging pump room).
		3) <u>WHEN</u> V-358 open, <u>THEN</u> direct AO to close V-268 to isolate charging pumps B and C from VCT (V-268 located in charging pump room).
	c. Start charging pumps as necessary and establish 75 gpm total charging flow	
	• Charging line flow	
	• Seal injection	

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
10	<p>Check If S/G Secondary Side Is Intact:</p> <ul style="list-style-type: none"> o Pressure in both S/Gs - STABLE OR INCREASING o Pressure in both S/Gs - GREATER THAN 100 PSIG 	<p><u>IF</u> any S/G pressure decreasing in an uncontrolled manner <u>OR</u> completely depressurized, <u>THEN</u> verify faulted S/G isolated unless needed for RCS cooldown:</p> <ul style="list-style-type: none"> • Steamlines • Feedlines <p><u>IF NOT</u>, <u>THEN</u> go to E-2, FAULTED STEAM GENERATOR ISOLATION, Step 1.</p> <p>***** <u>CAUTION</u> *****</p> <p>IF CST LEVEL DECREASES TO LESS THAN 5 FEET, THEN ALTERNATE WATER SOURCES FOR AFW PUMPS WILL BE NECESSARY (REFER TO ER-AFW.1; ALTERNATE WATER SUPPLY TO AFW PUMPS).</p> <p>*****</p> <p><u>NOTE:</u> TDAFW pump flow control valves fail open on loss of IA.</p>
11	<p>Check Intact S/G Levels:</p> <ul style="list-style-type: none"> a. Narrow range level - GREATER THAN 5% [25% adverse CNMT] b. Control feed flow to maintain narrow range level between 17% [25% adverse CNMT] and 50% 	<ul style="list-style-type: none"> a. Maintain total feed flow greater than 200 gpm until narrow range level greater than 5% [25% adverse CNMT] in intact S/G. b. <u>IF</u> narrow range level in the intact S/G continues to increase in an uncontrolled manner, <u>THEN</u> consider isolating unnecessary release paths: <ul style="list-style-type: none"> • TDAFW pump steam supply valves • S/G blowdown valves • Refer to Attachment RUPTURED S/G

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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

NOTE: Shutdown margin should be monitored during RCS cooldown (Refer to Figure SDM).

12 Initiate RCS Cooldown To Cold Shutdown:

a. Establish and maintain cooldown rate in RCS cold legs - LESS THAN 100°F/HR

b. Use RHR system if in service

c. Dump steam to condenser from intact S/G

c. Manually or locally dump steam using intact S/G ARV.

IF no intact S/G available,
THEN perform the following:

o Use faulted S/G.

-OR-

o IF RHR system NOT in service,
THEN use ruptured S/G.

13 Check RCS Subcooling Based On Core Exit T/Cs - GREATER THAN 0°F USING FIGURE MIN SUBCOOLING

Go to Step 26.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
14	Check If Subcooled Recovery Is Appropriate:	
	<ul style="list-style-type: none"> a. Check RWST level - GREATER THAN 50% b. Check ruptured S/G narrow level - LESS THAN 90% [85% adverse CNMT] 	<ul style="list-style-type: none"> a. IF CNMT sump B level is less than 113 inches, THEN go to ECA-3.2, SGTR WITH LOSS OF REACTOR COOLANT - SATURATED RECOVERY DESIRED, Step 1. b. Consult TSC to determine if recovery should be completed using ECA-3.2, SGTR WITH LOSS OF REACTOR COOLANT - SATURATED RECOVERY DESIRED.
15	Check Safeguards Pump Status	Go to Step 22.
	<ul style="list-style-type: none"> o SI pumps - ANY RUNNING -OR- o RHR pumps - ANY RUNNING IN INJECTION MODE 	
16	Place PRZR Heater Switches In The Following Positions:	
	<ul style="list-style-type: none"> o PRZR heater control group - PULL STOP o PRZR heater backup group - OFF 	

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>VOIDING MAY OCCUR IN THE RCS DURING RCS DEPRESSURIZATION. THIS WILL RESULT IN A RAPIDLY INCREASING PRZR LEVEL.</p> <p>*****</p> <p><u>NOTE:</u> o When using PRZR PORV, select one with an operable block valve.</p> <p> o If auxiliary spray is in use, then spray flow may be increased by closing normal charging valve AOV-294 and normal PRZR spray valves.</p> <p>17 Depressurize RCS To Refill PRZR:</p> <p> a. Use normal PRZR spray valve associated with running RCP</p> <p> • RCP A, PCV-431A</p> <p> • RCP B, PCV-431B</p> <p> b. PRZR level - GREATER THAN 13% [40% adverse CNMT]</p> <p> c. Stop RCS depressurization</p> <p> a. Use one PRZR PORV. <u>IF</u> IA <u>NOT</u> available, <u>THEN</u> refer to Attachment N2 PORVS.</p> <p> <u>IF</u> no PORV available, <u>THEN</u> use auxiliary spray valve.</p> <p> b. Continue with Step 18. <u>WHEN</u> level greater than 13% [40% adverse CNMT], <u>THEN</u> stop RCS depressurization.</p>		

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p>***** <u>CAUTION</u> IF RCP SEAL COOLING HAD PREVIOUSLY BEEN LOST, THEN THE AFFECTED RCP SHOULD NOT BE STARTED PRIOR TO A STATUS EVALUATION. *****</p>		
18	Check RCP Status:	
	a. Both RCPs - STOPPED	a. Stop all but one RCP and go to Step 19.
	b. RCS subcooling based on core exit T/Cs - GREATER THAN 0°F USING FIGURE MIN SUBCOOLING	b. Go to Step 26.
	c. PRZR level - GREATER THAN 13% [40% adverse CNMT]	c. Return to Step 17.
	d. Try to start an RCP	
	1) Establish conditions for starting an RCP	
	o Bus 11A or 11B energized	
	o Refer to Attachment RCP START	
	2) Start one RCP	

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
19	Check If One Of Three SI Pumps Should Be Stopped:	
a.	Three SI pumps - RUNNING	a. Go to Step 20.
b.	RCS subcooling based on core exit T/Cs - GREATER THAN 35°F [90°F adverse CNMT] USING FIGURE MIN SUBCOOLING	<p>b. <u>IF</u> RCS hot leg temperatures greater than 325°F [270°F adverse CNMT], <u>OR IF</u> RHR normal cooling in service, <u>THEN</u> go to Step 26.</p> <p><u>IF</u> RHR normal cooling <u>NOT</u> in service <u>AND</u> RCS hot leg temperatures less than 325°F [270°F adverse CNMT], <u>THEN</u> ensure at least one RHR pump running in injection mode and go to Step 19c. <u>IF</u> no RHR pump can be operated in injection mode, <u>THEN</u> go to Step 26.</p>
c.	Check PRZR level - GREATER THAN 13% [40% adverse CNMT]	c. Do <u>NOT</u> stop SI pump. Return to Step 17.
d.	Stop one SI pump	

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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

20 Check If One Of Two SI Pumps
Should Be Stopped:

a. Two SI pumps - RUNNING

a. Go to Step 21.

b. Determine required RCS
subcooling from table:

Charging Pump Availability	RCS Subcooling Criteria
NONE	120°F [200°F adverse CNMT]
ONE	115°F [190°F adverse CNMT]
TWO	105°F [180°F adverse CNMT]
THREE	100°F [175°F adverse CNMT]

c. RCS subcooling based on core
exit T/Cs - GREATER THAN VALUE
FROM TABLE ABOVE USING FIGURE
MIN SUBCOOLING

c. IF RCS hot leg temperatures
greater than 325°F [270°F
adverse CNMT], OR IF RHR normal
cooling in service, THEN go to
Step 26.

IF RHR normal cooling NOT in
service AND RCS hot leg
temperatures less than 325°F
[270°F adverse CNMT], THEN
ensure at least one RHR pump
running in injection mode and go
to Step 20d. IF no RHR pump can
be operated in injection mode,
THEN go to Step 26.

d. PRZR level - GREATER THAN 13%
[40% adverse CNMT]

d. Do NOT stop SI pump. Return to
Step 17.

e. Stop one SI pump

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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

21 Check If Last SI Pump Should Be Stopped:

a. One SI pump - RUNNING

a. IF any RHR pump running in injection mode, THEN go to Step 26. IF NOT, THEN go to Step 22.

b. Determine required RCS subcooling from table:

Charging Pump Availability	RCS Subcooling Criteria
NONE	Insufficient subcooling to stop SI pump.
ONE	255°F [295°F adverse CNMT]
TWO	235°F [285°F adverse CNMT]
THREE	210°F [270°F adverse CNMT]

c. RCS subcooling based on core exit T/Cs - GREATER THAN VALUE FROM TABLE ABOVE USING FIGURE MIN SUBCOOLING

c. IF RCS hot leg temperatures greater than 325°F [270°F adverse CNMT] OR IF RHR normal cooling in service, THEN go to Step 26.

IF RHR normal cooling NOT in service AND RCS hot leg temperatures less than 325°F [270°F adverse CNMT], THEN ensure at least one RHR pump running in injection mode and go to Step 21d. IF no RHR pump can be operated in injection mode, THEN go to Step 26.

d. PRZR level - GREATER THAN 13% [40% adverse CNMT]

d. Do NOT stop SI pump. Return to Step 17.

e. Stop running SI pump

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
22	<p>Start Charging Pumps As Necessary And Control Charging Flow To Maintain PRZR Level</p> <p>***** <u>CAUTION</u> *****</p> <p>IF RCP SEAL COOLING HAD PREVIOUSLY BEEN LOST, THEN THE AFFECTED RCP SHOULD NOT BE STARTED PRIOR TO A STATUS EVALUATION.</p> <p>*****</p>	
23	<p>Check RCP Status:</p> <p>a. RCPs - AT LEAST ONE RUNNING</p>	<p>a. Perform the following:</p> <p>1) Establish conditions for starting an RCP:</p> <ul style="list-style-type: none"> o Verify bus 11A or 11B energized. o Refer to Attachment RCP START. <p>2) Start one RCP.</p> <p><u>IF</u> an RCP can <u>NOT</u> be started, <u>THEN</u> verify natural circulation (Refer to Attachment NC).</p> <p><u>IF</u> natural circulation <u>NOT</u> verified, <u>THEN</u> increase dumping steam.</p>
	<p>b. Stop all but one RCP</p>	

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EOP:

ECA-3.1

TITLE:

SGTR WITH LOSS OF REACTOR COOLANT -
SUBCOOLED RECOVERY DESIRED

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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

NOTE: Leakage from ruptured S/G into RCS will dilute RCS boron concentration.

25 Verify Adequate Shutdown Margin

- a. Direct HP to sample RCS and ruptured S/G for boron concentration
- b. Verify boron concentration -
GREATER THAN REQUIREMENTS OF
FIGURE SDM

b. Borate as necessary.

26 Verify SI Flow Not Required:

- a. RCS subcooling based on core exit T/Cs - GREATER THAN 0°F
USING FIGURE MIN SUBCOOLING
- b. PRZR level - GREATER THAN 5%
[30% adverse CNMT]

- a. Manually operate SI pumps as necessary and go to Step 27.
- b. Manually operate SI pumps as necessary and return to Step 17.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
27	Check If SI ACCUMs Should Be Isolated:	
	<p>a. RCS subcooling based on core exit T/Cs - GREATER THAN 0°F USING FIGURE MIN SUBCOOLING</p> <p>b. PRZR level - GREATER THAN 5% [30% adverse CNMT]</p> <p>c. Dispatch AO with locked valve key to locally close breakers for SI ACCUM discharge valves</p> <ul style="list-style-type: none"> • MOV-841, MCC C position 12F • MOV-865, MCC D position 12C <p>d. Close SI ACCUM discharge valves</p> <ul style="list-style-type: none"> • MOV-841 • MOV-865 <p>e. Locally reopen breakers for MOV-841 and MOV-865</p>	<p>a. <u>IF</u> both RCS hot leg temperatures less than 400°F, <u>THEN</u> go to Step 27c.</p> <p><u>IF NOT</u>, <u>THEN</u> go to Step 28.</p> <p>b. Return to Step 17.</p> <p>d. Vent any unisolated ACCUMs:</p> <p>1) Open vent valves for unisolated SI ACCUMs.</p> <ul style="list-style-type: none"> • ACCUM A, AOV-834A • ACCUM B, AOV-834B <p>2) Open HCV-945.</p>

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
28	<p>Check If Emergency D/Gs Should Be Stopped:</p> <ul style="list-style-type: none"> a. Verify AC emergency busses energized by offsite power: <ul style="list-style-type: none"> o Emergency D/G output breakers - OPEN o AC emergency bus voltage - GREATER THAN 420 VOLTS o AC emergency bus normal feed breakers - CLOSED b. Stop any unloaded emergency D/G and place in standby (Refer to Attachment D/G STOP) 	<ul style="list-style-type: none"> a. Try to restore offsite power (Refer to ER-ELEC.1, RESTORATION OF OFFSITE POWER).
29	<p>Minimize Secondary System Contamination:</p> <ul style="list-style-type: none"> a. Isolate reject from hotwell to CST: <ul style="list-style-type: none"> o Place hotwell level controller (HC-107) in MANUAL at 50% o Verify hotwell level - STABLE b. Verify local actions to complete isolation of ruptured S/G (Refer to Attachment RUPTURED S/G) 	<ul style="list-style-type: none"> a. <u>IF</u> hotwell level increasing, <u>THEN</u> direct HP to sample hotwells for activity.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
30	<p>Verify Adequate SW Flow To CCW Hx:</p> <ul style="list-style-type: none"> a. Verify at least two SW pumps - RUNNING b. Verify AUX BLDG SW isolation valves - OPEN <ul style="list-style-type: none"> • MOV-4615 and MOV-4734 • MOV-4616 and MOV-4735 c. Verify CNMT RECIRC fan annunciator C-2, HIGH TEMPERATURE ALARM - EXTINGUISHED 	<ul style="list-style-type: none"> a. Manually start pumps as power supply permits (258 kw per pump). <u>IF</u> less than two SW pumps can be operated, <u>THEN</u> go to Step 31. b. Establish SW to AUX BLDG (Refer to Attachment AUX BLDG SW). c. Dispatch AO to locally throttle flow to CCW Hx to between 5000 gpm and 6000 gpm total flow.
31	<p>Check RCP Cooling</p> <ul style="list-style-type: none"> a. Check CCW to RCPs <ul style="list-style-type: none"> o Annunciator A-7, RCP 1A CCW RETURN HIGH TEMP OR LOW FLOW - EXTINGUISHED o Annunciator A-15, RCP 1B CCW RETURN HIGH TEMP OR LOW FLOW - EXTINGUISHED b. Check RCP seal injection <ul style="list-style-type: none"> o Labyrinth seal D/Ps - GREATER THAN 15 INCHES OF WATER <p style="text-align: center;">-OR-</p> <ul style="list-style-type: none"> o RCP seal injection flow to each RCP - GREATER THAN 6 GPM 	<p>Establish normal cooling to RCPs (Refer to Attachment SEAL COOLING).</p>

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
32	Check If Seal Return Flow Should Be Established:	
a.	Verify instrument bus D - ENERGIZED	a. Perform the following: 1) Ensure steam dump mode control in MANUAL. 2) Restore power to instrument bus D from MCC B or MCC A (maintenance supply).
b.	Verify RCP #1 seal outlet temperature - LESS THAN 235°F	b. Go to Step 33.
c.	Verify RCP seal outlet valves - OPEN • AOV-270A • AOV-270B	c. Manually open valves as necessary.
d.	Reset both trains of XY relays for RCP seal return isolation valve MOV-313	
e.	Open RCP seal return isolation valve MOV-313	e. Perform the following: 1) Place MOV-313 switch to OPEN. 2) Dispatch AO with key to RWST gate to locally open MOV-313.
f.	Verify RCP #1 seal leakoff flow - LESS THAN 5.5 GPM	f. <u>IF</u> any RCP seal leakoff flow greater than 5.5 gpm <u>THEN</u> : o Close the affected RCP seal discharge valve • RCP A, AOV-270A • RCP B, AOV-270B o Trip the affected RCP <u>IF</u> both RCP seal discharge valves are shut, <u>THEN</u> go to Step 33.
g.	Verify RCP #1 seal leakoff flow - GREATER THAN 0.25 GPM	g. Refer to AP-RCP.1, RCP SEAL MALFUNCTION.

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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

NOTE: Adverse CNMT conditions or loss of forced air cooling may result in failure of NIS detectors.

33 Check If Source Range Detectors Should Be Energized:

a. Source range channels -
DEENERGIZED

a. Go to Step 33e.

b. Check intermediate range flux -
EITHER CHANNEL LESS THAN
10⁻¹⁰ AMPS

b. Perform the following:

1) IF neither intermediate range channel is decreasing, THEN initiate boration.

2) Continue with Step 34. WHEN flux is LESS THAN 10⁻¹⁰ amps on any operable channel, THEN do Steps 33c, d and e.

c. Check the following:

c. Continue with Step 34. WHEN either condition met, THEN do Steps 33d and e.

o Both intermediate range channels - LESS THAN 10⁻¹⁰ AMPS

-OR-

o Greater than 20 minutes since reactor trip

d. Verify source range detectors -
ENERGIZED

d. Manually energize source range detectors by depressing P-6 permissive defeat pushbuttons (2 of 2).

IF source ranges can NOT be restored, THEN refer to ER-NIS.1, SR MALFUNCTION and go to Step 34.

e. Transfer Rk-45 recorder to one source range and one intermediate range channel

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
34	<p>Establish Normal Shutdown Alignment:</p> <p>a. Check condenser - AVAILABLE</p> <p>b. Perform the following:</p> <ul style="list-style-type: none"> o Open generator disconnects <ul style="list-style-type: none"> • 1G13A71 • 9X13A73 o Place voltage regulator to OFF o Open turbine drain valves o Rotate reheater steam supply controller cam to close valves o Place reheater dump valve switches to HAND o Stop all but one condensate pump <p>c. Verify Attachment SD-1 - COMPLETE</p>	<p>a. Dispatch AO to perform Attachment SD-2.</p>

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
***** <u>CAUTION</u> FEED FLOW SHOULD NOT BE ESTABLISHED TO ANY RUPTURED S/G WHICH IS ALSO FAULTED UNLESS NEEDED FOR RCS COOLDOWN. *****		
35	Check Ruptured S/G(s) Narrow Range Level - GREATER THAN 17% [25% adverse CNMT]	Refill ruptured S/G to 67% [55% adverse CNMT] using feed flow. IF either of the following conditions occurs, <u>THEN</u> stop feed flow to ruptured S/G unless needed for RCS cooldown: o Ruptured S/G pressure decreases in an uncontrolled manner. -OR- o Ruptured S/G pressure increases to 1020 psig.
36	Check If RCPs Must Be Stopped: a. RCPs - ANY RUNNING b. Check the following: o RCP #1 seal D/P - LESS THAN 220 PSID -OR- o Check RCP seal leakage - LESS THAN 0.25 GPM c. Stop affected RCP(s)	a. Go to Step 37. b. Go to Step 37.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
37	Check Condenser Steam Dump Available - CONDENSER VACUUM GREATER THAN 20 INCHES HG	<p>Manually or locally dump steam using intact S/G ARV.</p> <p><u>IF</u> no intact S/G available, <u>THEN</u>:</p> <ul style="list-style-type: none"> o Use faulted S/G. <p>-OR-</p> <ul style="list-style-type: none"> o <u>IF</u> RHR system <u>NOT</u> in service, <u>THEN</u> use ruptured S/G.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
38	Check If RHR Normal Cooling Can Be Established:	
a.	RCS cold leg temperature - LESS THAN 350°F	a. Go to Step 39.
b.	RCS pressure - LESS THAN 400 psig [300 psig adverse CNMT]	b. Go to Step 39.
c.	Place letdown pressure controller in MANUAL CLOSED	
d.	Check following valves - OPEN <ul style="list-style-type: none"> • AOV-371, letdown isolation valve • AOV-427, loop B cold leg to REGEN Hx • At least one letdown orifice valve (AOV-200A, AOV-200B, or AOV-202) 	d. Perform the following: <ol style="list-style-type: none"> 1) Reset both trains of XY relays for AOV-371 and AOV-427. 2) Open AOV-371 and AOV-427. 3) Open one letdown orifice valve.
e.	Verify pressure on PI-135 - LESS THAN 400 PSIG	e. Go to Step 39.
f.	Place RCS overpressure protection system in service (Refer to O-7, ALIGNMENT AND OPERATION OF THE REACTOR VESSEL OVERPRESSURE PROTECTION SYSTEM)	
g.	Consult TSC to determine if RHR normal cooling should be established using Attachment RHR COOL	

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EOP: ECA-3.1	TITLE: SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED	REV: 8 PAGE 32 of 32
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
39	Check Core Exit T/Cs - LESS THAN 200°F	Return to Step 11.
40	Evaluate Long Term Plant Status: a. Maintain cold shutdown conditions b. Consult TSC	
-END-		

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EOP: ECA-3.1	TITLE: SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED	REV: 8 PAGE 1 of 1
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ECA-3.1 APPENDIX LIST

<u>TITLE</u>	<u>PAGES</u>
1) RED PATH SUMMARY	1
2) FIGURE MIN SUBCOOLING	1
3) FIGURE SDM	1
4) ATTACHMENT CNMT RECIRC FANS	1
5) ATTACHMENT SI/UV	1
6) ATTACHMENT RUPTURED S/G	2
7) ATTACHMENT N2 PORVS	1
8) ATTACHMENT RCP START	1
9) ATTACHMENT D/G STOP	1
10) ATTACHMENT SEAL COOLING	2
11) ATTACHMENT SD-1	1
12) ATTACHMENT SD-2	1
13) ATTACHMENT RHR COOL	2
14) ATTACHMENT NC	1
15) ATTACHMENT AUX BLDG SW	1
16) FOLDOUT	1

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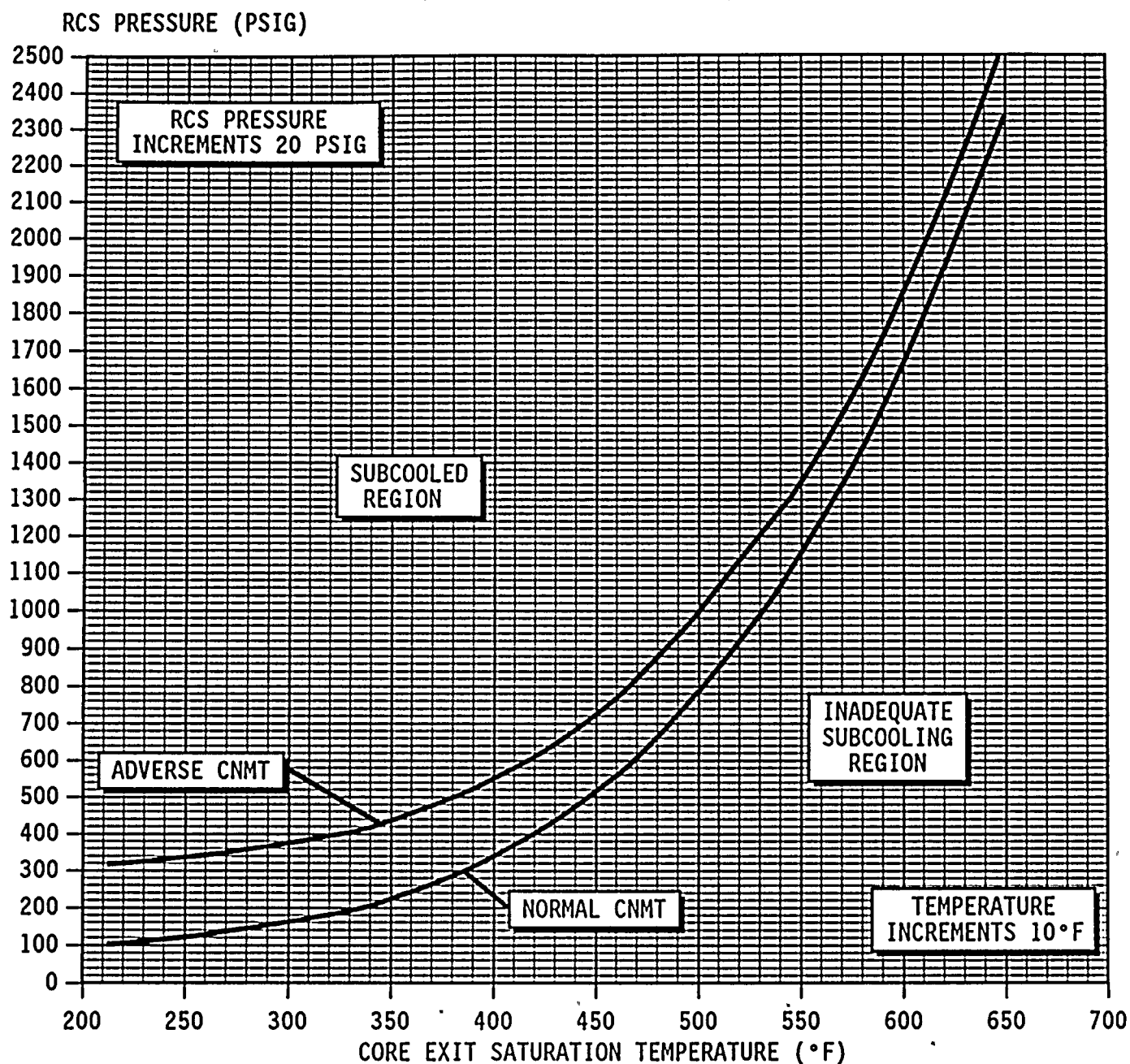
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FIGURE MIN SUBCOOLING

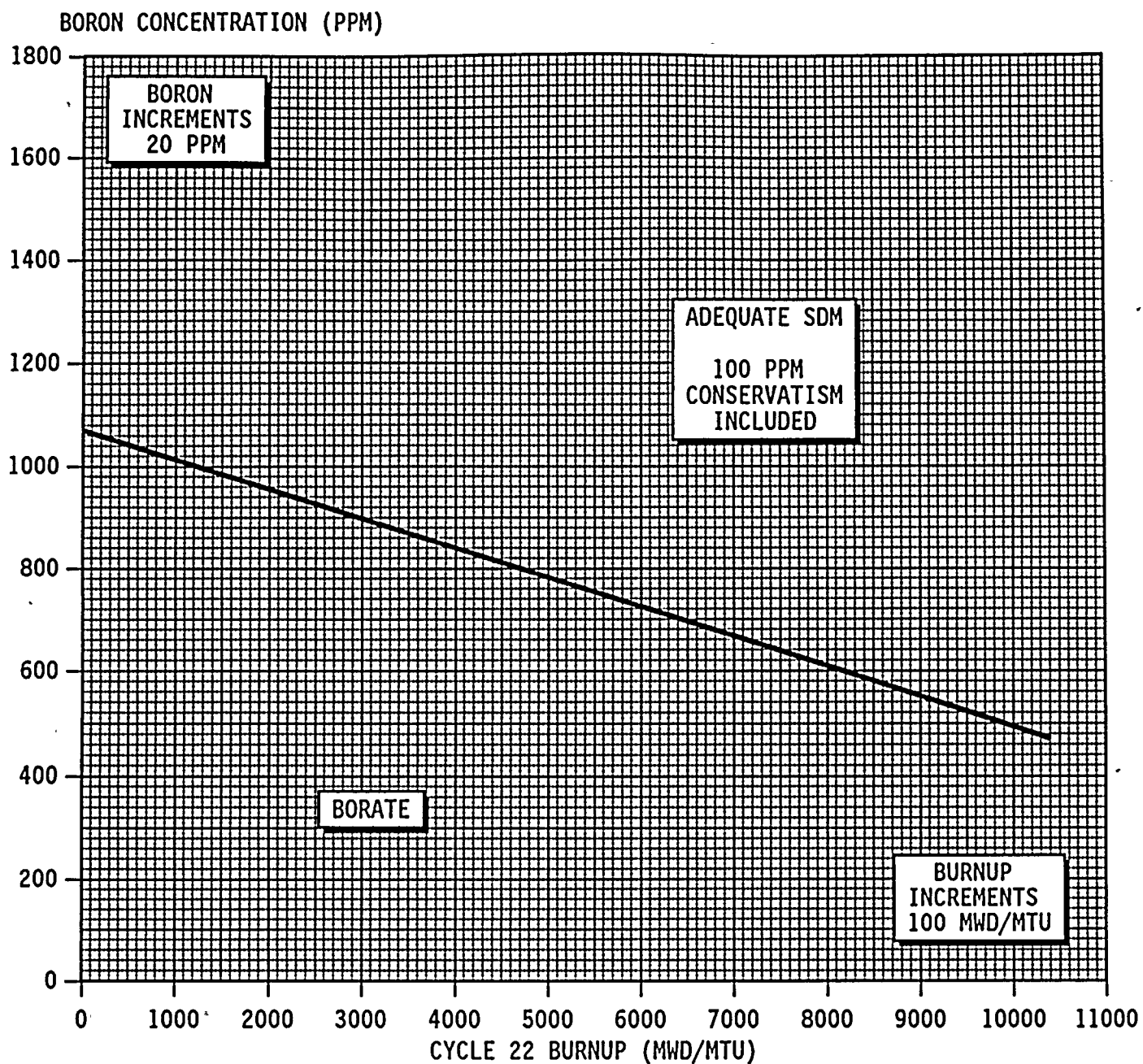
NOTE: Subcooling Margin = Saturation Temperature From Figure
Below [-] Core Exit T/C Indication



1. The first part of the document is a list of the names of the persons who were present at the meeting. The names are listed in alphabetical order.

The second part of the document is a list of the topics that were discussed at the meeting. The topics are listed in alphabetical order.

FIGURE SDM



NOTE: To obtain core burnup, use PPCS turn on code BURNUP.

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FOLDOUT PAGE

1. SI REINITIATION CRITERIA

IF EITHER condition listed below occurs, THEN manually operate SI pumps as necessary:

- o RCS subcooling based on core exit TCs - LESS THAN 0°F USING REQUIREMENTS OF FIGURE MIN SUBCOOLING
- o PRZR level - CHARGING CAN NOT CONTROL LEVEL GREATER THAN 5% [30% adverse CNMT]

2. SATURATED RECOVERY CRITERIA

IF ruptured S/G narrow range level increases to greater than 90% [85% adverse CNMT], THEN consult TSC to determine if recovery should be completed using ECA-3.2, SGTR WITH LOSS OF REACTOR COOLANT - SATURATED RECOVERY DESIRED.

3. SECONDARY INTEGRITY CRITERIA

IF any S/G pressure is decreasing in an uncontrolled manner or is completely depressurized AND has not been isolated, THEN go to E-2, FAULTED S/G ISOLATION, Step 1, unless faulted S/G needed for RCS cooldown.

4. COLD LEG RECIRCULATION SWITCHOVER CRITERION

IF RWST level decreases to less than 28%, THEN go to ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, Step 1.

5. AFW SUPPLY SWITCHOVER CRITERION

IF CST level decreases to less than 5 feet, THEN switch to alternate AFW water supply (Refer to ER-AFW.1, ALTERNATE WATER SUPPLY TO AFW PUMPS)

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